Planning Resource for Grade 4/5

Continuum of Mathematics Expectations

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NUMBER SENSE AND NUMERATION

1. Quantity Relationships

Grade 4	Grade 5
Overall Expectation	
- Read, represent, compare, and order whole numbers to 10 000, decimal numbers to tenths, and simple fractions, and represent money amounts to $100	- Read, represent, compare, and order whole numbers to 100 000, decimal numbers to hundredths, proper and improper fractions, and mixed numbers
Specific Expectations	
- Represent, compare, and order whole numbers to 10 000, using a variety of tools	- Represent, compare, and order whole numbers and decimal numbers from 0.01to 100 000, using a variety of tools
- Demonstrate an understanding of place value in whole numbers and decimal numbers from 0.1 to 10 000, using a variety of tools and strategies	- Demonstrate an understanding of place value in whole numbers and decimal numbers from 0.01 to 100 000, using a variety of tools and strategies
- Solve problems that arise from real-life situations and that relate to the magnitude of whole numbers up to 10 000	- Solve problems that arise from real-life situations and that relate to the magnitude of whole numbers up to 100 000
- Read and print in words whole numbers to one thousand, using meaningful contexts	- Read and print in words whole numbers to ten thousand, using meaningful contexts
- Represent fractions using concrete materials, words, and standard fractional notation, and explain the meaning of the denominator as the number of the fractional parts of a whole or a set, and the numerator as the number of fractional parts being considered	- Represent, compare, and order fractional amounts with like denominators, including proper and improper fractions and mixed numbers, using a variety of tools
- Compare and order fractions (i.e., halves, thirds, fourths, fifths, tenths) by considering the size and the number of fractional parts	
- Compare fractions to the benchmarks of 0, 1/2, and 1 (e.g., 1/8 is closer to 0 than 1/2; 3/5 more than 1/2)	
- Demonstrate and explain the relationship between equivalent fractions, using concrete materials and drawings	- Demonstrate and explain the concept of equivalent fractions, using concrete materials
- Represent, compare, and order decimal numbers to tenths, using a variety of tools and using standard decimal notation	
- Round four-digit whole numbers to the nearest ten, hundred, and thousand, in problems arising from real-life situations	- Round decimal numbers to the nearest tenth, in problems arising from real-life situations
	- Demonstrate and explain equivalent representations of a decimal number, using concrete materials and drawings
- Read and represent money amounts to $100	- Read and write money amounts to $1000

2. Counting

Grade 4	Grade 5
Overall Expectation	
- Demonstrate an understanding of magnitude by counting forward and backwards by 0.1 and by fractional amounts	- Demonstrate an understanding of magnitude by counting forward and backwards by 0.01
Specific Expectations	
- Count forward by halves, thirds, fourths, and tenths to beyond one whole, using concrete materials and number lines	
- Count forward by tenths from any decimal number expressed to one decimal place, using concrete materials and number lines	- Count forward by hundredths from any decimal number expressed to two decimal places, using concrete materials and number lines

3. Operational Sense

Grade 4	Grade 5
Overall Expectation	
- Solve problems involving the addition, subtraction, multiplication, and division of single- and multi-digit whole numbers, and involving the addition and subtraction of decimal numbers to tenths and money amounts, using a variety of strategies	- Solve problems involving the multiplication and division of multi-digit whole numbers, and involving the addition and subtraction of decimal numbers to hundredths, using a variety of strategies
Specific Expectations	
- Add and subtract two-digit numbers, using a variety of mental strategies	- Solve problems involving the addition, subtraction, and multiplication of whole numbers, using a variety of mental strategies
- Multiply to 9 x 9 and divide to 81 ÷ 9, using a variety of mental strategies	
- Solve problems involving the multiplication of one-digit whole numbers, using a variety of mental strategies	
- Solve problems involving the addition and subtraction of four-digit numbers, using student-generated algorithms and standard algorithms	
- Multiply whole numbers by 10, 100, and 1000, and divide whole numbers by 10 and 100, using mental strategies	
- Multiply two-digit whole numbers by one-digit whole numbers, using a variety of tools, student-generated algorithms, and standard algorithms	- Multiply two-digit whole numbers by two-digit whole numbers, using estimation, student-generated algorithms, and standard algorithms
- Divide two-digit whole numbers by one-digit whole numbers, using a variety of tools and student-generated algorithms	- Divide three-digit whole numbers by one-digit whole numbers, using concrete materials, estimation, student-generated algorithms, and standard algorithms
- Use estimation when solving problems involving the addition, subtraction, and multiplication of whole numbers, to help judge the reasonableness of a solution	- Use estimation when solving problems involving the addition, subtraction, multiplication, and division of whole numbers, to help judge the reasonableness of a solution
- Add and subtract decimal numbers to tenths, using concrete materials and student-generated algorithms	- Add and subtract decimal numbers to hundredths, including money amounts, using concrete materials, estimation, and algorithms
	- Multiply decimal numbers by 10, 100, 1000, and 10 000, and divide decimal numbers by 10 and 100, using mental strategies
- Add and subtract money amounts by making simulated purchases and providing change for amounts up to $100, using a variety of tools	

4. Proportional Relationships

Grade 5	
Overall Expectation	
- Demonstrate an understanding of proportional reasoning by investigating whole-number unit rates	- Demonstrate an understanding of proportional reasoning by investigating whole-number rates
Specific Expectations	
- Describe relationships that involve simple whole-number multiplication	- Describe multiplicative relationships between quantities by using simple fractions and decimals
- Determine and explain, through investigation, the relationship between fractions (i.e., halves, fifths, tenths) and decimals to tenths, using a variety of tools and strategies	- Determine and explain, through investigation using concrete materials, drawings, and calculators, the relationship between fractions (i.e., with denominators of 2, 4, 5, 10, 20, 25, 50, and 100) and their equivalent decimal forms
- Demonstrate an understanding of simple multiplicative relationships involving unit rates, through investigation using concrete materials and drawings	- Demonstrate an understanding of simple multiplicative relationships involving whole-number rates, through investigation using concrete materials and drawings

MEASUREMENT

1. Attributes, Units, and Measurement Sense

Grade 4	Grade 5
Overall Expectation	
- Estimate, measure, and record length, perimeter, area, mass, capacity, volume, and elapsed time, using a variety of strategies	- Estimate, measure, and record perimeter, area, temperature change, and elapsed time, using a variety of strategies
Specific Expectations	
- Estimate, measure, and record length, height, and distance, using standard units (i.e.,millimetre, centimetre, metre, kilometre)	
- Draw items using a ruler, given specific lengths in millimetres or centimetres	
- Estimate, measure (i.e., using an analogue clock), and represent time intervals to the nearest minute	- Estimate, measure (i.e., using an analogue clock), and represent time intervals to the nearest second
- Estimate and determine elapsed time, with and without using a time line, given the durations of events expressed in five-minute intervals, hours, days, weeks, months, or years	- Estimate and determine elapsed time, with and without using a time line, given the durations of events expressed in minutes, hours, days, weeks, months, or years
	- Measure and record temperatures to determine and represent temperature changes over time
- Estimate, measure using a variety of tools and strategies, and record the perimeter and area of polygons	- Estimate and measure the perimeter and area of regular and irregular polygons, using a variety of tools
- Estimate, measure, and record the mass of objects, using the standard units of the kilogram and the gram	
- Estimate, measure, and record the capacity of containers, using the standard units of the litre and the millilitre	
- Estimate, measure using concrete materials, and record volume, and relate volume to the space taken up by an object	

2. Measurement Relationships

Grade 4	Grade 5
Overall Expectation	
- Determine the relationships among units and measurable attributes, including the area and perimeter of rectangles	- Determine the relationships among units and measurable attributes, including the area of a rectangle and the volume of a rectangular prism
Specific Expectations	
- Describe, through investigation, the relationship between various units of length (i.e., millimetre, centimetre, decimetre, metre, kilometre)	- Select and justify the most appropriate standard unit (i.e., millimetre, centimetre, decimetre, metre, kilometre) to measure length, height, width, and distance, and to measure the perimeter of various polygons
- Select and justify the most appropriate standard unit (i.e., millimetre, centimetre, decimetre, metre, kilometre) to measure the side lengths and perimeters of various polygons	
	- Solve problems requiring conversion from metres to centimetres and from kilometres to metres
- Determine, through investigation, the relationship between the side lengths of a rectangle and its perimeter and area	- Determine, through investigation using a variety of tools and strategies, the relationships between the length and width of a rectangle and its area and perimeter, and generalize to develop the formulas [i.e., *Area* = *length* x *width*; *Perimeter* = (2 x *length*) + (2 x *width*)];
- Pose and solve meaningful problems that require the ability to distinguish perimeter and area	- Solve problems requiring the estimation and calculation of perimeters and areas of rectangles
- Compare and order a collection of objects, using standard units of mass (i.e., gram, kilogram) and/or capacity (i.e., millilitre, litre)	
- Determine, through investigation, the relationship between millilitres and litres	
- Determine, through investigation, the relationship between grams and kilograms	- Select and justify the most appropriate standard unit to measure mass (i.e., milligram, gram, kilogram, tonne)
- Select and justify the most appropriate standard unit to measure mass (i.e., milligram, gram, kilogram) and the most appropriate standard unit to measure the capacity of a container (i.e., millilitre, litre)	
- Solve problems involving the relationship between years and decades, and between decades and centuries	- Solve problems involving the relationship between a 12-hour clock and a 24-hour clock
- Compare, using a variety of tools, two-dimensional shapes that have the same perimeter or the same area	- Create, through investigation using a variety of tools and strategies, two-dimensional shapes with the same perimeter or the same area
	- Determine, through investigation using stacked congruent rectangular layers of concrete materials, the relationship between the height, the area of the base, and the volume of a rectangular prism, and generalize to develop the formula (i.e., *Volume* = *area of base* x *height*)
	- Determine, through investigation, the relationship between capacity (i.e., the amount a container can hold) and volume (i.e., the amount of space taken up by an object), by comparing the volume of an object with the amount of liquid it can contain or displace

GEOMETRY AND SPATIAL SENSE

1. Geometric Properties

Grade 4	Grade 5
Overall Expectation	
- Identify quadrilaterals and three-dimensional figures and classify them by their geometric properties, and compare various angles to benchmarks	- Identify and classify two-dimensional shapes by side and angle properties, and compare and sort three-dimensional figures
Specific Expectations	
- Draw the lines of symmetry of two-dimensional shapes, through investigation using a variety of tools and strategies	- Distinguish among polygons, regular polygons, and other two-dimensional shapes
- Identify and compare different types of quadrilaterals (i.e., rectangle, square, trapezoid, parallelogram, rhombus) and sort and classify them by their geometric properties	
- Identify and describe prisms and pyramids, and classify them by their geometric properties (i.e., shape of faces, number of edges, number of vertices), using concrete materials	- Distinguish among prisms, right prisms, pyramids, and other three-dimensional figures
- Identify benchmark angles (i.e., straight angle, right angle, half a right angle), using a reference tool and compare other angles to these benchmarks	- Identify and classify acute, right, obtuse, and straight angles
– Relate the names of the benchmark angles to their measures in degrees	– Measure and construct angles up to 90º, using a protractor
	– Identify triangles (i.e., acute, right, obtuse, scalene, isosceles, equilateral), and classify them according to angle and side properties
	– Construct triangles, using a variety of tools, given acute or right angles and side measurements

2. Geometric Relationships

Grade 4	Grade 5
Overall Expectation	
- Construct three-dimensional figures, using two-dimensional shapes	- Identify and construct nets of prisms and pyramids
Specific Expectations	
- Construct a three-dimensional figure from a picture or model of the figure, using connecting cubes	
– Construct three-dimensional figures, using only congruent shapes	
– Construct skeletons of three-dimensional figures, using a variety of tools, and sketch the skeletons	
– Draw and describe nets of rectangular and triangular prisms	- Identify prisms and pyramids from their nets
– Construct prisms and pyramids from given nets	– Construct nets of prisms and pyramids, using a variety of tools

3. Location and Movement

Grade 4	Grade 5
Overall Expectation	
- Identify and describe the location of an object, using a grid map, and reflect two-dimensional shapes	- Identify and describe the location of an object, using the cardinal directions, and translate two-dimensional shapes
Specific Expectations	
- Identify and describe the general location of an object using a grid system	- Locate an object using the cardinal directions (i.e., north, south, east,west) and a coordinate system
	– Compare grid systems commonly used on maps (i.e., the use of numbers and letters to identify an area; the use of a coordinate system based on the cardinal directions to describe a specific location)
- Identify, perform, and describe reflections using a variety of tools	– Identify, perform, and describe translations, using a variety of tools
– Create and analyse symmetrical designs by reflecting a shape, or shapes, using a variety of tools, and identify the congruent shapes in the designs	– Create and analyse designs by translating and/or reflecting a shape, or shapes, using a variety of tools

PATTERNING & ALGEBRA

1. Patterns and Relationships

Grade 4	Grade 5
Overall Expectation	
- describe, extend, and create a variety of numeric and geometric patterns, make predictions related to the patterns, and investigate repeating patterns involving reflections	- determine, through investigation using a table of values, relationships in growing and shrinking patterns, and investigate repeating patterns involving translations
Specific Expectations	
- create a number pattern involving addition, subtraction, or multiplication, given a pattern rule expressed in words	– make a table of values for a pattern that is generated by adding or subtracting a number to get the next term, or by multiplying or dividing by a constant to get the next term, given either the sequence or the pattern rule in words
- extend, describe, and create repeating, growing, and shrinking number patterns	- create, identify, and extend numeric and geometric patterns, using a variety of tools
- connect each term in a growing or shrinking pattern with its term number, and record the patterns in a table of values that shows the term number and the term	- build a model to represent a number pattern presented in a table of values that shows the term number and the term
- make predictions related to repeating geometric and numeric patterns	– make predictions related to growing and shrinking geometric and numeric patterns
- extend and create repeating patterns that result from reflections, through investigation using a variety of tools	– extend and create repeating patterns that result from translations, through investigation using a variety of tools

2. Expressions and Equality

Grade 4	Grade 5
Overall Expectation	
- demonstrate an understanding of equality between pairs of expressions, using addition, subtraction, and multiplication	- demonstrate, through investigation, an understanding of the use of variables in equations
Specific Expectations	
- determine, through investigation, the inverse relationship between multiplication and division	
- identify, through investigation and use the commutative property of multiplication to facilitate computation with whole numbers	
- identify, through investigation , and use the distributive property of multiplication over addition to facilitate computation with whole numbers	
- determine the missing number in equations involving multiplication of one- and two-digit numbers, using a variety of tools and strategies	– determine the missing number in equations involving addition, subtraction, multiplication, or division and one- or two digit numbers, using a variety of tools and strategies
	– demonstrate, through investigation, an understanding of variables as changing quantities, given equations with letters or other symbols that describe relationships involving simple rates
	– demonstrate, through investigation, an understanding of variables as unknown quantities represented by a letter or other symbol

DATA MANAGEMENT & PROBABILITY

1. Collection and Organization of Data

Grade 4	Grade 5
Overall Expectation	
- collect and organize discrete primary data and display the data using charts and graphs, including stem-and-leaf plots and double bar graphs	- collect and organize discrete or continuous primary data and secondary data and display the data using charts and graphs, including broken-line graphs
Specific Expectations	
	– distinguish between discrete data (i.e., data organized using numbers that have gaps between them, such as whole numbers, and often used to represent a count, such as the number of times a word is used) and continuous data (i.e., data organized using all numbers on a number line that fall within the range of the data, and used to represent measurements such as heights or ages of trees)
- collect data by conducting a survey or an experiment to do with themselves, their environment, issues in their school or the community, or content from another subject, and record observations or measurements	- collect data by conducting a survey or an experiment do with themselves, their environment, issues in their school or community, or content from another subject, and record observations or measurements
- collect and organize discrete primary data and display the data in charts, tables, and graphs (including stem-and-leaf plots and double bar graphs) that have appropriate titles, labels, and scales that suit the range and distribution of the data, using a variety of tools	- collect and organize discrete or continuous primary data and secondary data and display the data in charts, tables, and graphs (including broken-line graphs) that have appropriate titles, labels and scales that suit the range and distribution of the data using a variety of tools
	- demonstrate an understanding that sets of data can be samples of larger populations
	- describe, through investigation, how a set of data is collected and explain whether the collection method is appropriate

2. Data Relationships

Grade 4	Grade 5
Overall Expectations	
- read, describe, and interpret primary data and secondary data presented in charts and graphs, including stem-and-leaf plots and double bar graphs	- read, describe, and interpret primary data and secondary data presented in charts and graphs, including broken-line graphs
Specific Expectations	
- read, interpret, and draw conclusions from primary data from secondary data presented in charts, tables, and graphs (including stem-and-leaf plots and double bar graphs)	– read, interpret, and draw conclusions from primary data and from secondary data
- describe the shape of a set of data across its range of values, using charts, tables, and graphs	– calculate the mean for a small set of data and use it to describe the shape of the data set across its range of values, using charts, tables, and graphs
- compare similarities and differences between two related sets of data, using a variety of strategies	– compare similarities and differences between two related sets of data, using a variety of strategies
- demonstrate, through investigation, an understanding of median and determine the median of a set of data	

3. Probability

Grade 4	Grade 5
Overall Expectation	
- predict the results of a simple probability experiment, then conduct the experiment and compare the prediction to the results	- represent as a fraction the probability that a specific outcome will occur in a simple probability experiment, using systematic lists and area models
Specific Expectations	
	- determine and represent all the possible outcomes in a simple probability experiment, using systematic lists and area models
- predict the frequency of an outcome in a simple probability experiment, explaining their reasoning; conduct the experiment; and compare the result with the prediction	- pose and solve simple probability problems, and solve them by conducting probability experiments and selecting appropriate methods of recording the results
- determine, through investigation, how the number of repetitions of a probability experiment can affect the conclusions drawn	
	- represent, using a common fraction, the probability that an event will occur in simple games and probability experiments